1. (original) An apparatus for freezing a biological sample in a container while moving along a longitudinal axis of the apparatus, the container having a first container dimension perpendicular to the axis, a second container dimension parallel to the axis, and a container thickness, the first container dimension being defined by the maximum level which said sample may have along the first container dimension, the apparatus comprising:

(a) at least one set of two cooling plates with inner surfaces having a first plate dimension perpendicular to the axis, and a second plate dimension parallel to the axis, defining therebetween a passage whose width corresponds to the container thickness and which is no larger than said first plate dimension, the first plate dimension being at least as large as the level of the biological sample along the first container dimension; and

(b) a motion unit adapted for movement of the container through said passage along the axis so as to allow cooling of the sample by conduction from the inner surfaces of the plates.

2. (original) An apparatus according to Claim 1, wherein the plates are oriented vertically, the first plate dimension being the height.

3. (original) An apparatus according to Claim 1, wherein the plates are oriented horizontally, the first plate dimension being the width.

4. (original) An apparatus according to Claim 1, wherein the inner surfaces of the plates are parallel to side walls of the containers, the inner surfaces being designed so to allow said movement and said cooling.

5. (original) An apparatus according to Claim 1, further comprising a retention device adapted to hold the container.

6. (original) An apparatus according to Claim 1, further comprising more than one set of cooling plates, wherein at least two of adjacent sets are separated by a gap.

7. (original) An apparatus according to Claim 1, wherein the cooling plates comprise at least one channel adapted for flow of a cryogenic fluid therethough.

8. (original) An apparatus according to Claim 7, wherein the cryogenic fluid includes liquid nitrogen.

9. (original) An apparatus according to Claim 1, wherein at least one freezing parameter is controlled by a feedback control system.

10. (original) An apparatus according to Claim 9, further comprising a heating arrangement associated with said cooling plates.

11. (original) An apparatus according to Claim 10, wherein the heating arrangement comprises at least one electric resistance heater.

12. (original) An apparatus according to Claim 9, wherein the feedback control system comprises temperature sensors.

13. (original) An apparatus according to Claim 9, wherein the feedback control system comprises a processor.

14. (original) An apparatus according to Claim 13, wherein the processor is capable of controlling at least one of the list including flow of cryogenic fluid, pressure of the cryogenic fluid, heating arrangement, and motion unit.

15. (original) An apparatus according to Claim 1, further comprising monitoring means.

16. (original) An apparatus according to Claim 15, wherein the monitoring means comprises a video camera.

17. (original) An apparatus according to Claim 15, wherein the monitoring means comprises a device capable of taking a temperature measurement of the biological sample during freezing.

18. (original) An apparatus according to Claim 17, wherein the device is an infrared thermograph.

19. (original) An apparatus according to Claim 1, the apparatus further comprising a first chamber adapted to receive the container, a second chamber adapted to perform the freezing, and a third chamber adapted for removal therefrom of the container after freezing, said chambers constituting at least a portion of the passage.

20. (original) An apparatus according to Claim 19, adapted to initiate the freezing within the first chamber.

21. (original) An apparatus according to Claim 1, adapted to initiate the freezing external to the passage.

22. (original) An apparatus according to Claim 21, further adapted to initiate the freezing in an area of the container and to introduce the container into the passage after the initiation, wherein during the initiation the container is disposed such that the area is near the top thereof, and during introduction into the passage the area is near the front thereof in the direction of the movement.

23. (original) An apparatus according to Claim 19, wherein the third chamber is adapted to cool the container to a temperature which is below that achieved as a result of freezing.

24. (original) An apparatus according to Claim 1, wherein the axis is disposed vertically.

25. (original) An apparatus according to Claim 24, further adapted to initiate the freezing internal to the passage, the movement taking place from a lower portion of the passage to a higher portion of the passage.

26. (currently amended) A method of cooling a biological sample, the method comprising:

(a) providing an apparatus according to ~~any one of Claims 1 through 25~~ Claim 1;

(b) inserting therein a container containing a biological sample;

(c) providing a predetermined temperature gradient along the axis; and

(d) moving the container through the passage along the axis.

27. (new) A method according to Claim 26, wherein the plates of said apparatus are oriented vertically, the first plate dimension being the height.

28. (new) A method according to Claim 26, wherein the inner surfaces of the plates of said apparatus are parallel to side walls of the containers, the inner surfaces being designed so to allow said movement and said cooling.

29. (new) A method according to Claim 26, wherein said apparatus comprises a retention device adapted to hold the container.

30. (new) A method according to Claim 26, wherein said apparatus comprises more than one set of cooling plates, wherein at least two of adjacent sets are separated by a gap.

31. (new) A method according to Claim 26, wherein at least one freezing parameter is controlled by a feedback control system.

32. (new) A method according to Claim 31, further comprising a heating arrangement associated with said cooling plates.

33. (new) A method according to Claim 31, wherein the feedback control system comprises temperature sensors.

34. (new) A method according to Claim 31, wherein the feedback control system comprises a processor.

35. (new) A method according to Claim 35, wherein the processor is capable of controlling at least one of the list including flow of cryogenic fluid, pressure of the cryogenic fluid, heating arrangement, and motion unit.

36. (new) A method according to Claim 26, wherein said apparatus comprises monitoring means.

37. (new) A method according to Claim 36, wherein the monitoring means comprises a video camera.

38. (new) A method according to Claim 36, wherein the monitoring means comprises a device capable of taking a temperature measurement of the biological sample during freezing.

39. (new) A method according to Claim 38, wherein the apparatus is an infrared thermograph.

40. (new) A method according to Claim 26, wherein the apparatus comprises a first chamber adapted to receive the container, a second chamber adapted to perform the

freezing, and a third chamber adapted for removal therefrom of the container after freezing, said chambers constituting at least a portion of the passage.

41. (new) A method according to Claim 40, wherein said apparatus is adapted to initiate the freezing within the first chamber.

42. (new) A method according to Claim 26, wherein the axis is disposed vertically.

43. (new) A method according to Claim 42, further adapted to initiate the freezing internal to the passage, the movement taking place from a lower portion of the passage to a higher portion of the passage.